

***Dracaena Mottle Virus* in Lucky Bamboo¹**

Carlye A. Baker² and Ayyamperumal Jeyaprakash³

INTRODUCTION: *Dracaena mottle virus* (DrMV) belongs to the virus genus, *Badnavirus*. This genus belongs to the plant virus family, *Caulimoviridae*, the only plant virus family with a double-stranded DNA genome. In addition, at least three of the viral genera in this plant virus family, which includes the *Badnaviruses*, are known to integrate into their host's genome ([Lyttle et. al. 2011](#)). These integrated viruses can excise themselves from the plant's genome and reform into virus particles capable of being transmitted to other hosts either by mechanical inoculation or by insects. This usually happens when the plant comes under stressful conditions ([Harper et. al. 2002](#)).

[Lucky bamboo](#) (VanZile 2013) is not bamboo (Family Poaceae), but a plant called *Dracaena braunii* Engl. (Family *Asparagaceae*; syn *Dracaena sanderiana*, Family *Liliaceae*). Young plant stalks are braided, twisted and curled into many different shapes and sold as an important part of the [Feng Shui](#) tradition (Wong 2013) in Asia. These plants are believed to bring good luck and good fortune, especially if given as a gift. It is highly likely that this distorting manipulation causes stress to the plant.

Finished lucky bamboo plants are imported in large numbers to the United States and sold retail in a variety of markets outside the usual plant vendors. In December of 2012, during the gift-giving time of the Christmas holidays, what appeared to be virus-infected plants of lucky bamboo were collected and sent to the Florida Department of Agriculture and Consumer Services Division of Plant Industry for diagnosis.



Fig. 1. Symptoms of *Dracaena mottle virus* on lucky bamboo (*Dracaena braunii*).
Photography credit: Mariana Beckman, FDACS-DPI

SYMPTOMS: The disease symptoms seen in the leaves of the lucky bamboo samples consisted of mottling and chlorotic patches on the leaves (Fig. 1). Illustrations of similar symptoms were provided in a paper by L. Su et al. ([2007](#)).

¹Contribution No. 789, Bureau of Entomology, Nematology and Plant Pathology – Plant Pathology Section

²Plant Pathology Virologist, FDACS, Division of Plant Industry, Post Office Box 147100, Gainesville, Florida 32614-7100

³Molecular Biologist in Plant Pathology, FDACS, Division of Plant Industry, Post Office Box 147100, Gainesville, Florida 32614-7100

DETECTION AND DIAGNOSIS: According to Su *et al.* (2007), New Zealand's National Plant Pest Reference Laboratory detected a possible *Badnavirus* in *D. braunii* with similar symptoms. They were able to obtain a complete genomic sequence of the virus from *D. braunii* plants from China with those symptoms. When compared to other sequences in the [GenBank](#), the sequences proved to be an unknown *Badnavirus* and it was named *Dracaena mottle virus*. Sequences obtained from the Florida *D. braunii* plants using primers DrF1 and DrR1 (Su *et. al.* 2007) matched the sequences in the GenBank for *Dracaena mottle virus*.

CONTROL: Su *et al.* also showed that asymptomatic plants of *D. braunii* had multiple copies of the DrMV sequence integrated into their genome. This presents a problem for the control of this virus in lucky bamboo and probably in *Dracaena spp.* in general. Chances are that most *Dracaena* plants have copies of this virus's DNA in their nuclear genome and would test positive for this virus in a PCR test. (This test cannot tell whether the sequences were from free virus particles or integrated viral DNA.) To remove the virus would be extremely difficult and perhaps unwise. Some research has suggested that the integrated virus may actually help a plant by suppressing infection by other plant viruses (Mette *et. al.* 2002). The best possible control at this time might be to avoid stressing the plants and thus the expression of symptoms.

VIRUS DISTRIBUTION AND HOST RANGE: As far as is known, *Dracena spp* are the only hosts this virus infects. The virus has been officially reported from New Zealand, China and Florida, but is likely present wherever Asian propagations of lucky bamboo are marketed.

LITERATURE CITED (All accessed 2014 April)

- Harper, G., R. Hull, B. Lockhart and N. Olszewski. 2002. Viral sequences integrated into plant genomes. *Annu Rev Phytopath* 40:119-136 <http://www.ncbi.nlm.nih.gov/pubmed/12147756>
- GenBank. 2013. <http://www.ncbi.nlm.nih.gov/genbank/>
- Lyttle, D.J., D.A. Orlovich and P.L. Guy. 2011. Detection and analysis of endogenous badnaviruses in the New Zealand flora. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3104934/>
- Mette, M.F., T. Kanno, W. Aufsatz, J. Jakowitsch, J. van der Winden, M.A. Matzke and A.J.M. Matzke. 2002. Endogenous viral sequences and their potential contribution to heritable virus resistance in plants. *EMBO J* 21:461-469. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC125834/>
- Su, L., S. Goa, Y. Juang, J. Chaogun, S. Wang, Y. Ma, R. Fang and X. Chen. 2007. Complete genomic sequence of *Dracaena mottle virus*, a distinct badnavirus. *Virus Genes* 35:423-429. <http://www.ncbi.nlm.nih.gov/pubmed/17497213>
- VanZile, J. 2014. Growing lucky bamboo. <http://houseplants.about.com/od/typesofhouseplants/a/LuckyBamboo.htm>
- Wong, C. 2013. *Feng Shui*. <http://altmedicine.about.com/od/chinesemedicinetcm/g/fengshui.htm>